Evergreen MxPro™ Processor Upgrade

180 and 200 MHz Versions

White Paper

Version 3.4, 5/8/98

EVERGREEN technologies

Table of Contents

Overview

The Evergreen MxPro 180 and 200 processor upgrades are high performance CPU replacements for 75 MHz and higher speed Pentium® processor-based systems. The advanced architecture of the MxPro boosts older systems to new PC performance and enables users to run software enabled for MMX instructions. The advanced feature set of the Evergreen MxPro delivers superior performance over other CPU upgrades.

Upgrade Path and Bus Speeds

The Evergreen MxPro runs at a maximum speed rating of 180 or 200 MHz. Users with 75 MHz and higher speed systems can upgrade to 180 or 200 MHz.

	Evergreen Solution	
Original Pentium System		Evergreen MxPro 180
75, 90, 100, 120, 133, 150 MHz	→→→→→	180 MHz
Original Pentium System		Evergreen MxPro 200
75, 90, 100, 120, 133, 150, 166 MHz	→→→→→	200 MHz*

* Some systems may not support full 200 MHz operation

The Evergreen MxPro 180 utilizes the 60 MHz bus speed of 90, 120, and 150 MHz systems and delivers the full 180 MHz performance. Other speed systems achieve full 180 MHz performance when the bus speed is changed to 60 MHz.

Similarly, the Evergreen MxPro 200 employs the 66 MHz bus speed of 100, 133, and 166 MHz systems to deliver the full 200 MHz performance. Changing the bus speed to 66 MHz enables 75, 90, 120 and 150 MHz systems to run at the full 200 MHz.

In contrast, the maximum speed of the Intel MMX OverDrive is limited by the bus: 150 MHz for 75 MHz systems; 180 MHz for 90, 120 and 150 MHz systems; and 166 or 200 MHz for systems at 100, 133, or 166 MHz.

	Intel Solution	
Original Pentium System		MMX OverDrive
75 MHz	→→→→→	150 MHz only
90, 120, 150 MHz	→→→→→	180 MHz only
100, 133, 166 MHz	→→→→→	166 or 200* MHz

* Does not support Socket 5

Advanced Architecture – 64K Cache

The Evergreen MxPro is based on an advanced architecture that includes a 64-kilobyte internal cache. This internal cache is twice the size of the cache found in the Intel MMX OverDrive processors allowing the MxPro to deliver optimal performance for Windows® operating environments.

MMX Instruction Compatible

The Evergreen MxPro is MMX instruction compatible and boosts processor performance for all software including software designed for MMX instructions. The MxPro runs Windows 98, Windows NT, multimedia and games faster. The MMX instruction compatible processor delivers crisper graphics as well as clearer sound and video.

Compatibility

The Evergreen MxPro supports 75 MHz and higher speed Pentium processor-based systems. To support older systems, the MxPro includes BIOS software that updates the system BIOS if necessary. In addition, the MxPro is both Socket 5 and 7 compatible.

BIOS Software

The BIOS (Basic Input Output System) of some older systems does not support newer CPU architectures such as the Evergreen MxPro. Therefore, Evergreen has developed BIOS updates to support selected older systems and motherboards. The BIOS updates are included in the INSTALL software and should be used only on selected systems.

Socket 5 and 7 Compatible

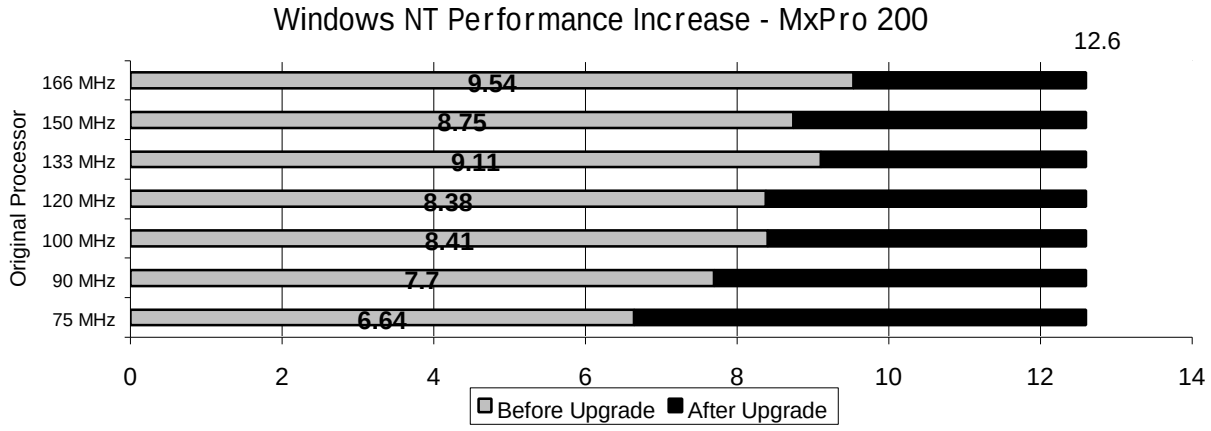
The Evergreen MxPro supports both Socket 5 and Socket 7 motherboard infrastructure. This results in higher compatibility for your system. In comparison, the Intel MMX OverDrive 200 does not support Socket 5.

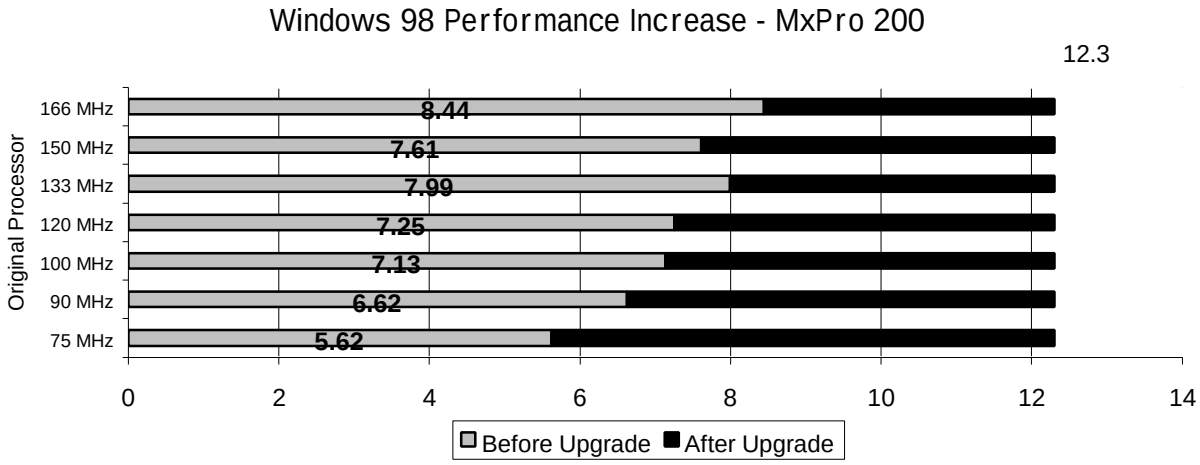
Performance

The charts below show the performance of the Evergreen MxPro when used to upgrade 75 MHz and higher speed Pentium processor-based systems. The first charts show the software performance increase of systems that have been upgraded to the MxPro 180 and 200 using Windows 98 and Windows NT benchmarks. The second section compares the performance of the MxPro to the Intel MMX OverDrive offerings.

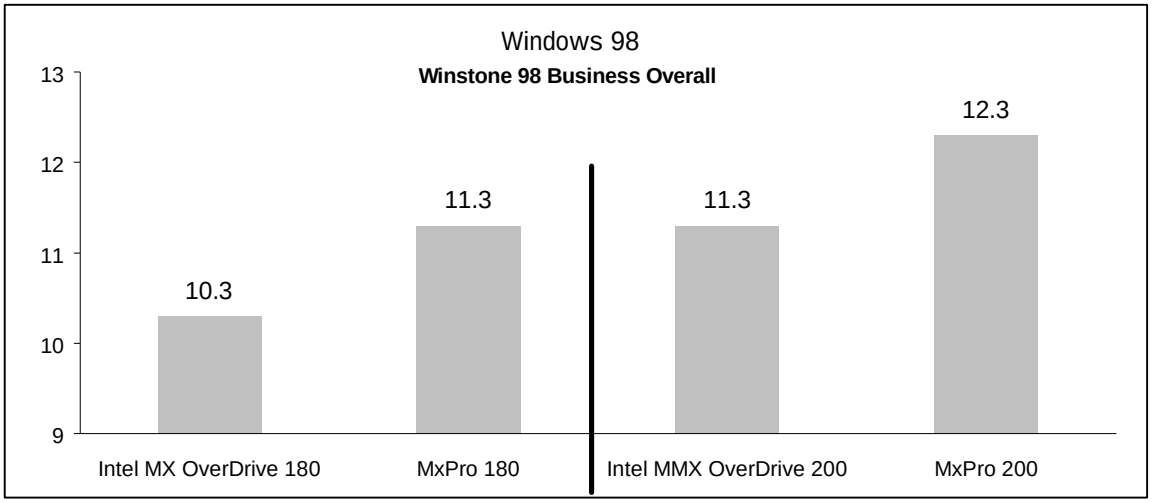
Software Performance Increase

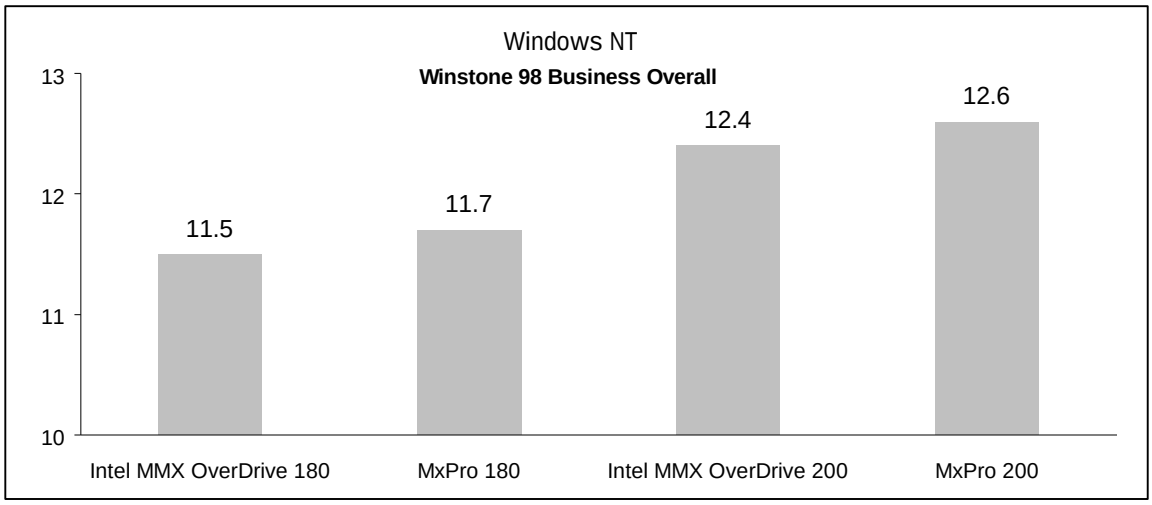
Original Pentium Processor	Evergreen MxPro 180/200	Software Performance Increase	
		Windows 98	Windows NT
75 MHz	180/200 MHz	101% / 119%	76% / 90%
90 MHz	180/200 MHz	71% / 86%	52% / 64%
100 MHz	180/200 MHz	58% / 73%	39% / 50%
120 MHz	180/200 MHz	56% / 70%	40% / 50%
133 MHz	180/200 MHz	41% / 54%	28% / 38%
150 MHz	180/200 MHz	48% / 62%	34% / 44%
166 MHz	200 MHz	46%	32%





Performance Compared to Intel MMX OverDrive





Performance Summary

The results show that systems upgraded to the Evergreen MxPro have a substantial increase in performance. The results also show that the MxPro performs faster than Intel MMX OverDrives on most software. In addition, systems upgraded with the MxPro realize significant increases in Windows 98, Windows NT, and multimedia/games software performance.

Summary

The Evergreen MxPro processor upgrade delivers new PC performance to older Pentium processor-based systems and runs software enabled for MMX instructions. The advanced 64-kilobyte cache architecture enables the MxPro to outperform other processor upgrades such as the Intel MMX OverDrive processors.

Business and home users can defer the high cost of new PC purchases and save money by upgrading their older system to the Evergreen MxPro.

Table A – Summary of Performance Results

Software Performance Increase

Winstone 98 V1.0 Business	Original 75 MHz	Original 90 MHz	Original 100 MHz	Original 120 MHz	Original 133 MHz	Original 150 MHz	Original 166 MHz	Evergreen MxPro 180	Evergreen MxPro 200
Windows NT 4.00.1381									
Browser	0.61	0.74	0.82	0.81	0.91	0.86	0.94	1.28	1.41
Publishing	0.66	0.75	0.82	0.82	0.89	0.86	0.93	1.13	1.21
SS/Database	0.69	0.81	0.87	0.86	0.91	0.88	0.96	1.15	1.25
WP	0.67	0.77	0.84	0.85	0.93	0.90	0.98	1.21	1.28
Overall	6.64	7.70	8.41	8.38	9.11	8.75	9.54	11.7	12.6
Windows 98 RC 1									
Browser	0.50	0.60	0.68	0.66	0.74	0.70	0.81	1.23	1.36
Publishing	0.54	0.63	0.70	0.70	0.77	0.73	0.82	1.09	1.20
SS/Database	0.59	0.69	0.75	0.74	0.81	0.77	0.83	1.12	1.18
WP	0.59	0.69	0.76	0.76	0.84	0.81	0.89	1.15	1.25
Overall	5.62	6.62	7.13	7.25	7.99	7.61	8.44	11.3	12.3

Performance Compared to Intel MMX OverDrive

Winstone 98 V1.0 Business	Intel MMX 180	Evergreen MxPro 180	Intel MMX 200	Evergreen MxPro 200
Windows 98 RC-1				
Browser	1.06	1.23	1.20	1.36
Publishing	0.99	1.09	1.08	1.20
SS/Database	1.00	1.12	1.09	1.18
WP	1.12	1.15	1.21	1.25
Overall	10.3	11.3	11.3	12.3
Windows NT				
Browser	1.19	1.28	1.32	1.41
Publishing	1.10	1.13	1.19	1.21
SS/Database	1.15	1.15	1.23	1.25
WP	1.21	1.21	1.30	1.28
Overall	11.5	11.7	12.4	12.6

Table B – System Configuration

Performance benchmarks for the processor upgrades were run on the following system.

System	Gateway 2000 P5-75 (Intel Advanced/ZP "Zappa" Motherboard)
L2 Cache	256k
RAM	32 MB EDO
Original BIOS	AMI BIOS version 1.00.11.BSOT
Graphics/Video	PowerGraph64 (STB) S3 PCI VGA card Rev C, 1024x768 resolution @ 256 colors (2Meg)
Hard Disk	Western Digital 1.1 GB, Caviar 2100
Chipset	437FX Chipset